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Prevalence of Malnutrition and Its Associated Factors among Adult People Living with HIV/AIDS receiving Anti Retroviral Therapy at Butajira Hospital, Southern Ethiopia

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
AOR	Adjusted Odds Ratio
ART	Anti Retroviral Therapy
BD FACS	Becton Dickson Fluorescent Activated Cell Sorter
BMI	Body Mass Index
CD	Cluster of Differentiation
CDC	Center for Disease Control
CI	Confidence Interval
COR	Crude Odds Ratio
DHS	Demographic and Health Survey
ETB	Ethiopian Birr
FMOH	Federal Minister of Health
HAART	Highly Active Anti Retroviral Therapy
HDD	Household Dietary Diversity
HFIAS	Household Food Insecurity Access Scale
HIV	Human Immunodeficiency Virus
IQR	Inter Quartile Range
OI	Opportunistic Infections
PLWHA	People Living with HIV/AIDS
RUTF	Ready to Use Therapeutic Food

SD	Standard Deviation
SNNPR	Southern Nations Nationalities and People's Region
SPSS	Statistical Package for Social Science
SSA	Sub-Saharan Africa
US	United States
WHO	World Health Organization

Abstract

Background: Malnutrition and HIV/AIDS are highly prevalent in Sub-Saharan Africa and they are linked in a vicious cycle. Intestinal parasite co-infection worsens the effect of malnutrition among HIV patients. However, the magnitude of malnutrition and its associated factors among People Living with HIV/AIDS are not well understood at Butajira in particular and in Ethiopia in general.

Objective: The aim of this study was to assess the prevalence of malnutrition and its associated factors among Adult People Living with HIV/AIDS receiving ART.

Methods: Institution based cross-sectional study was conducted and systematic random sampling technique was used to select study subjects. A total of 305 study subjects were enrolled in the study. Structured and pre-tested questionnaire were used to collect socio-demographic, clinical and nutritional related data. From each sampled patient, anthropometric and laboratory data were collected. Both bivariate and multivariate logistic regression analyses were used to assess the effect of the various factors on the level of malnutrition. P value ≤ 0.05 at 95% CI was considered statistically significant.

Results: The overall prevalence of malnutrition was 25.2% (95% CI: 20.0% – 30.2%), of which 49(63.6%), 19(24.7%), 9(11.7%) were mildly, moderately and severely malnourished, respectively. Multivariate Logistic regression analysis revealed that living in rural area (AOR=1.98, 95% CI: 1.10, 3.53), anemia (AOR=1.94, 95% CI: 1.05, 3.57), eating difficulty (AOR= 2.69, 95% CI: 1.41, 5.11), using Ready to Use Therapeutic Food (AOR= 0.18, 95% CI: 0.08, 0.40), and intestinal parasitic co-infection (AOR=2.85, 95% CI: 1.54, 5.27) were significantly associated with malnutrition.

Conclusion: Malnutrition was found to be high among HIV/AIDS patients receiving ART. Living in rural area, anemia, eating difficulty, Ready Use Therapeutic Food, and intestinal parasitic co-infection were found to be significant factors associated with malnutrition. To alleviate the problems, strengthening household food security, following up for intestinal parasites and anemia consistently, and identifying and treating the cause of poor dietary consumption as early as possible, should be considered.

Key words: Malnutrition, HIV/AIDS, ART, Intestinal parasites

1. Introduction

Globally, more than 800 million people are chronically undernourished [1] and over 35 million people are living with Human Immunodeficiency Virus (HIV). Although new cases have been reported all over the globe, the majority of cases have been reported in low and middle-income countries, particularly in Sub-Saharan Africa (SSA) [2]. In Ethiopia, 1.5% of adult people aged 15-49 are infected with HIV [3]. Malnutrition combined with Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) brought significant crisis in SSA in particular and globally in general. HIV affects the health status of an individual, and it has an impact on households, communities and economic growth of the nations. In most developing countries, malnutrition together with infectious diseases aggravated the HIV/AIDS pandemic and contributed for both mortality and morbidity of patients [4, 5].

HIV/AIDS and malnutrition effects are interconnected and worsen one another in a vicious cycle, and cause progressive damage to the immune system independently. HIV specifically affects nutritional status by reducing food intake, increasing energy requirements, and affecting nutrient absorption and metabolism adversely [6, 7]. Malnutrition by itself can decrease Cluster of differentiation (CD4+) T cells and contributes for abnormal B-cell responses [8, 9], which adversely affects the overall clinical outcome and exacerbates HIV related immune depression [10].

Estimated Anti Retroviral Therapy (ART) coverage in Ethiopia was 60% with 288 137 people reported receiving ART in 2012. Since the introduction of ART, the overall morbidity and mortality due to AIDS and related complications have greatly reduced [11]. However, ART Medications can cause troubling symptoms like nausea, vomiting, loss of appetites, diarrhea and other disorders [12]. Metabolic complications are also well observed in adults living with HIV/AIDS who receive ART, including lipodystrophy, insulin resistance, dyslipidemia, and osteopenia [13, 14].

Diarrhea adversely affects the nutritional status and causes morbidity and mortality in People Living with HIV/AIDS (PLWHA) all over the globe particularly in developing countries [15, 16]. Chronic diarrhea is directly associated with more hasten disease progression and death [17].

Some of the causes of diarrhea are AIDS-defining complications, but virtually parasitic infection such as *Giardia lamblia, Entamoeba histolytica, ascaris lumbrucoids* and hookworm may be responsible [18].

Adequate nutrition is necessary to manage Opportunistic Infections (OI), maintain the immune system, optimize response to medical treatment, and support optimal quality of life for PLWHA [19]. Evidence has shown that a good nutrition may contribute to slowing the progression of the disease. Nutrition interventions can also help to optimize the benefits of antiretroviral drugs and may increase compliance with treatment regimens [20].

Socio-demographic factors such as gender, income and other environmental factors together with gastrointestinal complications, OI as a result of AIDS were reported to be factors associated with malnutrition among PLWHA [21-23].

There are different reports that documented the high magnitude of both malnutrition and HIV/AIDS in Ethiopia. However, the prevalence of malnutrition among PLWHA is not well studied in Ethiopia particularly at Butajira. Therefore, the aim of this study was to assess the prevalence of malnutrition and its associated factors among adult PLWHA receiving ART.

2. Literature Review

The prevalence of malnutrition among PLWHA was reported higher in deferent parts of the world. In a study conducted in Sao Paulo, Brazil among hospitalized adult AIDS cases, the prevalence of malnutrition was 43%. Old age was found independently associated with malnutrition together with very low daily per capital household income [24]. Mariz CA et al also documented that among 2,018 individuals living with HIV/AIDS in Reo De Jainairo, the prevalence of underweight was 8.8%. Anemia and CD4+ T cell count < 200mm^3 were associated with under-nutrition [25].

On the other hand, a study conducted in China showed a 37.2% prevalence of malnutrition measured by Body Mass Index (BMI). The study also reported a significant relationship between OI with malnutrition [26].

In Spain, among PLWHA, 81.1% were malnourished of which 16.7% were on severe degree of malnutrition. Degree of immune suppression, chronic hepatitis C virus infection and waist circumference were associated with malnutrition [27].

A meta-analysis from Demographic and Health Survey (DHS) of 11 SSA countries showed a 10.3% pooled prevalence of HIV-related malnutrition. The pooled prevalence of HIV-related malnutrition had been higher among women that were unemployed than among women that were professionally employed, and lower residing in urban areas than rural areas [28].

In Botswana, among HIV-positive adults aged 20 to 50 years, 28.5% were reported malnourished (BMI < 18.5 kg/m ^{2}). Unintentional weight loss and gastrointestinal symptoms were significantly associated with a high risk of developing malnutrition [29].

A cross sectional study conducted on 300 adults living with HIV/AIDS in Dakar, Senegal showed that an overall malnutrition of 39%, of which 14% were severely malnourished. It also observed that diarrhea and oral candidasis were highly associated to malnutrition [30].

In Kenya, among 497 HIV positive individuals, 20.3% were malnourished of which mild malnutrition (20.8%), moderate malnutrition (43.6%) and severe malnutrition (35.6%) were reported. The macronutrient intakes were found no significant association with body composition at the baseline [22].

Obi et al documented that among PLWHA in Nigeria, 58.3% mild to moderate malnutrition and 32.5% Severe malnutrition were reported [31].

The prevalence of malnutrition among PLWHA receiving ART was also reported in different parts of Ethiopia. A study conducted on 153 HIV-positive adults living in Addis Ababa showed that 18% were chronically energy deficient. The study also demonstrated that low serum zinc levels (< 10.7 µmol/L) in 53% of participants, low serum retinol levels (< 30 µg/dL) in 47% of participants and low hemoglobin levels (< 12 g/dL) were observed in only 4.72% subjects [32]. In Bahir-Dar, among 408 adult HIV/AIDS clients, the overall prevalence of malnutrition was 25.5%. When the study subjects were stratified as on ART and pre-ART cases, 22.1% and 34.5% respectively were reported malnourished. Feeding difficulties, HIV related symptoms and duration on ART were found to be the predictors of malnutrition [33]. Taye et al also documented that among 331 adult PLWHA on ART in Gondar, the prevalence of under-nutrition was 27.8%. Income, nutritional support, presence of eating problems and duration of ART were found to be the pertinent predictors of malnutrition [34]. The prevalence of malnutrition among on ART women in Tigray showed that an under-nutrition of 42.3%, severe (12%), moderate (10%) and mild (20.3%) malnutrition. The prevalence of wasting (body weight loss >5%) was accounted 75% and severe wasting was 26.9%. Household food insecurity, anemia, inadequate dietary diversity and absence of nutritional support were found to be predictors of under-nutrition [35]. Another study conducted in Dilla also reported that, the overall prevalence of malnutrition in PLWHA was 12.3%. World Health Organization (WHO) clinical stage four, unemployment, gastrointestinal symptoms and previous one OI and two & above previous OI were significantly associated with malnutrition [21].

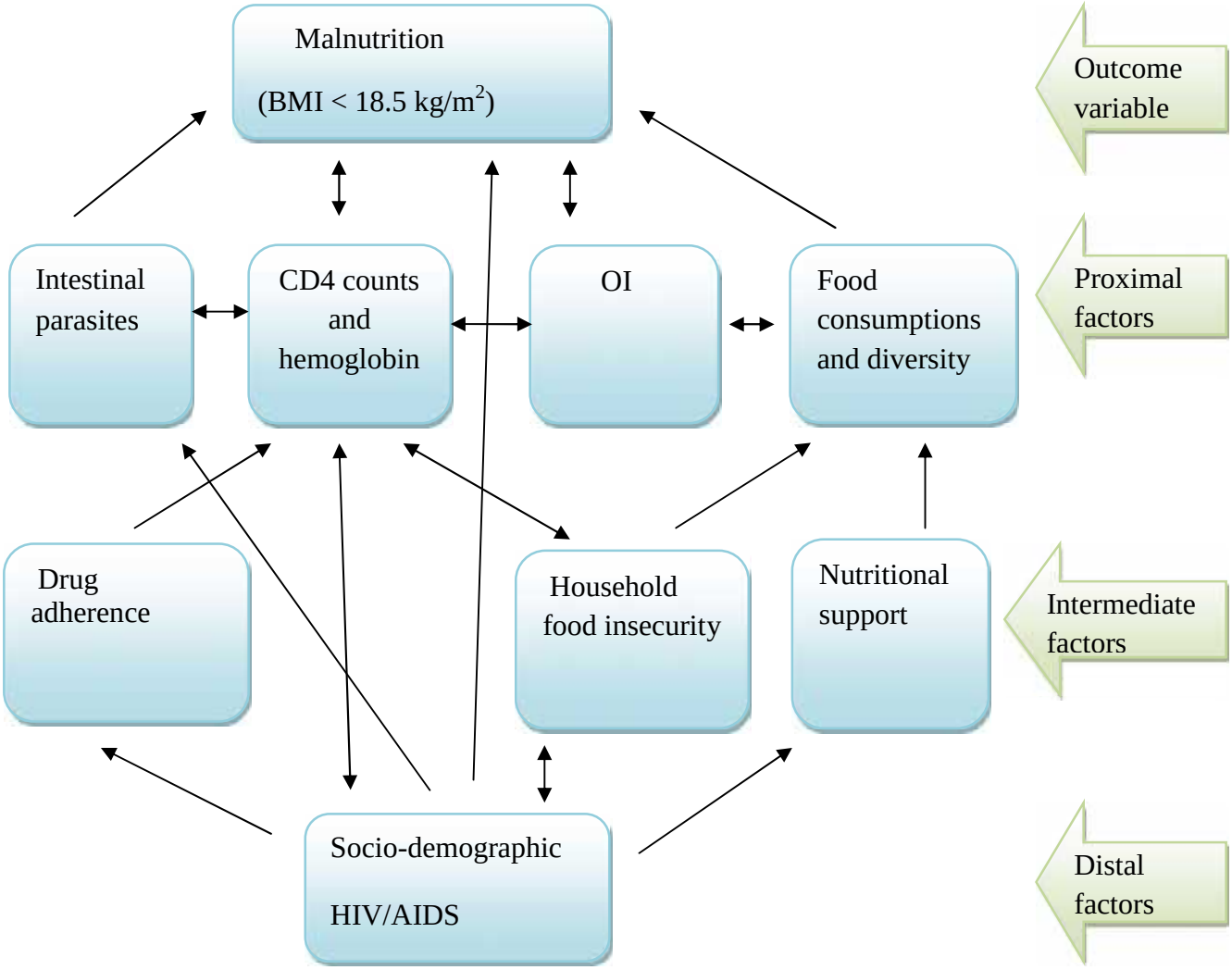

Figure 1: Conceptual frame work of malnutrition and its associated factors among adult PLWHA receiving ART.

3. Significance of the Study

In Ethiopia, malnutrition among PLWHA receiving ART has been a major challenge to accomplish the full impact of intervention. There are different reports that showed large magnitude of both HIV/AIDS and malnutrition in Ethiopia. However, the burden of malnutrition among PLWHA receiving ART is not known at Butajira zonal administration in particular. Moreover, determinants of nutritional status especially intestinal parasitic infection are not comprehensively studied. Hence, this study was designed to assess the prevalence of malnutrition and its associated factors among adult HIV/AIDS clients receiving ART at Butajira Hospital, Southern Ethiopia. The study outcome intern helps to governmental and non-governmental HIV/AIDS care and support organizations for better nutritional planning and management for PLWHA care. It also helps to develop appropriate strategy to intervene and break up the effect of HIV/AIDS and pertinent associated factors on the level of malnutrition.

4. Objectives

4.1. General objective

The major aim of this study was to assess the prevalence of malnutrition and its associated factors among adult PLWHA receiving ART at Butajira Hospital, Southern Ethiopia, 2014.

4.2. Specific objectives

- To determine the prevalence of malnutrition among adult PLWHA receiving ART.
- To identify the factors associated with malnutrition among adult PLWHA receiving ART.

5. Methods and Materials

5.1. Study area

The study was conducted at Butajira Hospital which is found in Butajira town, Gurage Zone, Southern Nations Nationalities and People's Region (SNNPR), located 135 km from the capital-city, Addis Ababa. The town lies on the average at 2,100 meter above sea level. Butajira Hospital is a zonal hospital with 110 beds that gives health service for people living at Butajira and the surrounding rural kebeles. A total of 1054 adult HIV/AIDS clients have been enrolled to ART care clinic at Butajira Hospital, of which 450 were in pre-ART care, and 604 on ART care.

5.2. Study design and period

The study was an institution based cross-sectional study conducted from October, 2013 to June, 2014.

5.3. Population

5.3.1. Source population

The source populations were all adult PLWHA at Butajira town and the surrounding area that were enrolled for ART follow up service at Butajira Hospital.

5.3.2. Study population

The study populations were people with the age of 18 years and above who were receiving ART**.**

5.4. Inclusion criteria

Patients who were receiving ART and involved in ART follow up at Butajira Hospital and aged 18 years and above were included in the study.

5.5. Exclusion criteria

Pregnant, lactating mothers (six month of post-partum), seriously ill and/or patients with spinal deformity were excluded**.**

5.6. Variables

5.6.1. Dependent variable

Under-nutrition (yes/no)

5.6.2. Independent variables

Socio-demographic variables such as age, sex, marital status, family size, residence, educational status, occupation, monthly income.

Clinical related variables such as OI, gastrointestinal symptoms, eating difficulty, intestinal parasites, who clinical stage, CD4+ T cell count, hemoglobin level.

Nutritional related variables such as household food insecurity access (HFIAS), household dietary diversity (HDD), dietary counseling, and nutritional support.

ART related variables such as drug adherence, duration of ART.

5.7. Operational definition

Under-nutrition: Adult PLWHA and their BMI less than 18.50 kg/m^2 were considered as under-nutrition based on WHO classification for malnutrition using BMI [36].

Household Food Insecurity Access Scale (HFIAS) is a measure of house hold food insecurity/security of study subjects in the past four weeks. It was calculated based on nine questions of food access and it was categorized in to 1 = Food Secure, 2=Mildly Food Insecure Access, 3=Moderately Food Insecure Access, 4=Severely Food Insecure Access [37].

Household Dietary Diversity (HDD) is the economic ability of a household to access a variety of foods during the past 24 hrs period. Twelve of the questions were used to assess dietary diversity. Participants were asked to report the frequency of consumption of each food using the past 24 hours. Participants received 1 point if they consumed at least once during the last 24 hours of the foods within each subgroup and 0 points if they never consumed the food. The mean household dietary diversity score in the study subjects was calculated. Then tertiles of the dietary diversity score were computed with the highest tertile defined as adequate diversified diet, while the lowest tertiles were inadequate diversified diet [38].

Anemia status was classified by using the level of hemoglobin concentration in g/dl. Hemoglobin level was ranged between 13–17 and 12–16 g/dl was considered as normal for male and female patients, respectively [39]. Patients were classified as anemic for females and male when the hemoglobin concentration was < 12 g/dl and < 13 g/dl respectively.

Drug adherence status was estimated by percent of missed dose enclosed last six months follow-up time from patient ART follow-up form combined with self reported adherence measurement technique was used by asking the patients about the number of times they have missed taking their pills each month and recorded [40].

Good adherence: if the average adherence is greater than 95% (he/she missed $\leq$ 2 doses of 30 doses or $\leq$ 3 doses of 60 doses).
Fair adherence: if the average adherence is 85 – 94% (he/she missed 3 – 5 doses of 30 doses or 3 – 9 doses of 60 doses).

Poor adherence**:** if the average adherence is < 85 % (he/she missed ≥ 6 doses from 30 doses or > 9 doses of 60 doses).

5.8. Sample size and sampling technique

The sample size was determined using single population proportion formula taking the prevalence of malnutrition among adults with HIV/AIDS receiving ART 22.1% [33] with 5% marginal error and 95% confidence interval (CI) of certainty (alpha = 0.05).

Thus the sample size was n = $\frac{(z)^2 \times p \times q}{(w)^2} = \frac{(1.96)^2 \times 0.221 \times 0.779}{(0.05)^2} = \mathbf{265}$

Where: n = Sample size, p = prevalence of malnutrition (22.1%), q = (1-p), z = critical value 1.96, w= precision (marginal error) = 5%.

In this study, 15% of non-response rate was taken, and the final sample size was **305.** Therefore, 305 adult with HIV/AIDS clients were included in the study**.**

A systematic random sampling technique was used to select the study subjects. According to the Hospital report, on average 10 – 20 patients currently taking ART have been visiting the Hospital daily. In order to get sample interval (k), the total population then divided by the sample size required.

$$K = \frac{604}{305} \approx 2$$

Therefore, the first client was taken randomly by lottery method as case one, every other of the daily attended during the data collection period was included and interviewed until a total of 305 samples were obtained.

5.9. Data collection and laboratory methods

5.9.1. Socio-demographic data

The data was collected from March, 2013 to May 2014 using structured questionnaire. Socio-demographic characteristics such as age, sex, monthly income, educational and marital status together with nutrition and clinical related characteristics were collected. Four data collectors (one nurse, one health officer and two laboratory technicians) and one supervisor were recruited

and two days training were given. The data collection process was followed daily by the supervisor and principal investigator.

5.9.2. Laboratory data

Data on hemoglobin, CD4+ T cell count, opportunistic disease in the past six months, WHO clinical stages of disease, and drug adherence were obtained from patient charts and ART follow-up forms. CD4+ T cell count was measured with Becton Dickson Fluorescent Activated Cell Sorter (BD FACS) machine United Status (US) and categorized according to its clinical significance. Hemoglobin was measured with Cell Dyne hematology analyzer (US). Hemoglobin level ranged between 13–17 and 12–16 g/dl was considered as normal for male and female patients, respectively. Patients were graded anemic when the hemoglobin concentration was < 12 g/dl and < 13 g/dl for male and female patients respectively.

5.9.3. Anthropometric data

Anthropometric measurements (weight, height) were recorded by trained nurse. Weight of the participants was measured in kilograms and recorded to the nearest 0.1 kg using standard beam balance and the scale was checked at zero before and after each measurement. Each participant was asked to remove heavy clothes. Measurement of height was conducted using the standard measuring scale and recorded to the nearest 0.5 cm. The participants were asked to take off their shoes, stand erect, and look straight in vertical plain. The occipital, shoulder, buttocks, and the heel touch the standing measuring board.

5.9.4. Sample collection and microscopy

Approximately two gram stool samples were collected in a clean leak proof cupped plastic container following standard operating procedures. Each sample was examined by two clinical laboratory technicians independently for intestinal parasites using direct microscopic and concentration methods at Butajira Hospital parasitology Laboratory. In the case of direct microscopic examination, stool samples were mixed with physiological saline (0.85% NaCl) on a microscope slide and covered with a cover slip then examined microscopically using low power objective first and high dry power objective to examine cysts of intestinal parasites.

In the case of formal-ether concentration method, about 2 gram or 2 ml of stool sample was mixed with about 10 ml of normal saline solution and thoroughly mixed. This was filtered through two layers of gauze into a centrifuge test tube and centrifuged for one minute at a speed 25000 rpm. When the supernatant fluid was very cloudy, the deposit was washed again by mixing it with 10 ml of normal saline. After pouring or removing the supernatant fluid, 10 ml of formaldehyde solution (10% formalin solution) was added to the sediment. After mixing the suspension well and allowed to stand for 5 minute, 3 milliliter of ether was added and immediately stopper and vigorously shake for 30 seconds. The preparation centrifuged for one minute at low speed usually 1500 rpm. There appeared four layers in the preparation; the first layer which is ether, the second layer debris, the third layer formaldehyde solution and the fourth layer which is the deposit containing stages of parasites (cysts, egg and/or larvae). The supernatant was removed by tilting the tube and pour off all the fluid. The sediment mixed with the remaining small fluid and about two drops of the deposit was placed on a slide, to which a drop of iodine solution was added and covered with cover slide. The entire preparation was examined using 10X objective for protozoa eggs and 40X objective for cysts.

5.9.5. Quality control

There were a continuous monitoring of test quality and comprehensive checking of all steps. The questionnaire was adapted and modified in to our context from previous literatures. It was prepared first in English and then translated into the local language Amharic, and then retranslated back to English by an expert to maintain its consistency. Training was given for data collectors and supervisor. Pre-testing of the questionnaire was made on 20 patients receiving ART in the nearby Health Center a week prior to the actual survey. Data collection process was strictly followed day to day by the supervisor and principal investigator**.** Aseptic techniques and standard operating procedures were followed during sample collection, processing, transportation and identification of intestinal parasites.

5.9.6. Data analysis and interpretation

Data was checked for completeness, coded, and first entered in to EPI-info version 7, then it was rechecked and transferred to Statistical Package for Social Science (SPSS) version 20 for analysis. Chi-square was used to carry out descriptive analysis. Bivariate and multivariate

logistic regression analyses were used to assess the effect of the various factors on the level of malnutrition and to control possible confounders. The absence of multi-co-linearity was checked by using VIF/tolerance. The model adequacy was checked by using Hosmer and Lemeshow goodness of fit test. P-value ≤ 0.05 at 95% CI was considered statistically significant.

5.9.7. Dissemination of results

Results of this study will be disseminated through publication, presentation on conferences and seminars. A copy of it will be offered to Butajira hospital, the region (SNNPR), University of Gondar, School of Biomedical and Laboratory science and other concerned organizations.

5.9.8. Ethical consideration

Ethical clearance was obtained from ethical review committee of University of Gondar, College of Medicine and Health Sciences, School of Biomedical and Laboratory Sciences prior to data collection. Permission was taken from Butajira Zonal Hospital administrators. Written informed consent was obtained from each participant after the purpose of the study explained. Participants were told that they had full right not to participate and they were also informed that all the data obtained from them would be kept confidential using codes instead of any personal identifiers. Any study participants who are positive for intestinal parasite were referred to ART clinicians for treatment. Finally, those participants identified as under-nutrition were given nutritional counseling and RUTF in collaboration with the clinicians working in ART clinic at Butajira hospital.

6. Results

6.1. Socio-demographic characteristics of the study participants

A total of 305 adult PLWHA receiving ART were involved in this study giving a response rate of 100%. The majority of participants (60.7%) were in the age group of 30 – 44 years with the mean and Standard Deviation (±SD) age of 39.5 (± 9.9) years. The majority (62 %) of study participants were women. More than half (50.5%) of the study participants were currently married. The majority of participants (86.6%) have low monthly income (<1000 Ethiopian birr (ETB) as shown in (Table 1).

6.2. Clinical profiles and ART status of the study participants

More than $3/5^{th}$ of the study participants (60.3%; n= 184) were at WHO clinical stage I. One hundred twenty seven patients (41.6%) had current or past history of opportunistic infections, of which 73 patients (23.9%) had tuberculosis infection and accounted for the uppermost co-infection. The median CD4+ T cell count and mean hemoglobin concentration level of participants were 400 cells/µl with inter-quartile range (329 IQR) and 13.0 g/dl with SD ±1.7, respectively (Table 2).

The majority of patients, 132 (43.3%) were on ART regimen 1e (TDF+3TC+NVP) followed by 1c (AZT+3TC+NVP), (122(40%). However, most patients (38.7%) had changed the ART regimen due to toxicity/side effects during follow up period (Table 2).

6.3. Nutrition related characteristics of the study participants

Data on the household food insecurity and dietary diversity status showed that more than $3/4^{th}$ (79%) of participants were food insecure, of which 14 (4.6%), 99 (32.5%), 128 (42%) were mildly, moderately and severely food insecure respectively. The mean household dietary diversity was 4.93 with SD $\pm$1.8. Moreover, 121 (39.7%) participants were with inadequate dietary diversity (Table 3).

Table 1: Socio-demographic characteristics of the study participants at Butajira Hospital, Southern Ethiopia, 2014, (n = 305)

Characteristics		Frequency (n)	Percent (%)
Sex	Male	116	38.0
	Female	189	62.0
Age	18 – 29	36	11.8
	30 – 44	185	60.7
	≥ 45	84	27.5
Marital status	Single	19	6.2
	Married	154	50.5
	Divorced	42	13.8
	Widowed	81	26.6
	Separated	9	3.0
Family size	≤ 3	148	22.8
	4 – 6	137	21.1
	>6	20	3.1
Educational status	Unable to read and write	121	39.7
	Able to read and write	38	12.5
	Primary education	80	26.2
	Secondary education	47	15.4
	Tertiary education	19	6.2
Religion	Orthodox	143	46.9
	Muslim	102	33.4
	Protestant and Catholic	60	19.7
Ethnicity	Gurage	178	58.4
	Silitie	55	18.0
	Amhara	40	13.1
	Oromo	14	4.6
	Hadiya	18	5.9
Occupation	Governmental employer	40	13.1
	Self employer	51	16.7
	Farmer	39	12.8
	Merchant	45	14.8
	Daily laborer	60	19.7
	House wife	49	16.1
	Jobless	21	6.9

Residence	Urban	177	58.0
	Rural	128	42.0
Monthly income in ETB	<1000	264	86.6
	≥1000	41	13.4

Table 2: Clinical profiles and ART status of the study participants at Butajira Hospital, Southern Ethiopia, 2014, (n = 305)

Variables			Frequency(n)	Percent (%)
Eating difficulty	No		235	77.0
	Yes	Problems	70	23.0
		Loss of appetite	63	20.7
		Vomiting	20	6.6
		Nausea	13	4.3
		Swallowing difficulty	6	2
Gastrointestinal symptoms	No		255	83.6
	Yes	Problems	50	16.4
		Diarrhea	28	9.2
		Indigestion	22	7.2
		Constipation	7	2.7
WHO clinical stage	Stage I		184	60.3
	Stage II		54	17.7
	Stage III		60	19.7
	Stage IV		7	2.3
CD4+ T cell count	<200 cells/µl		51	16.7
	200 – 350 cells/µl		73	23.9
	351 - 500 cells/µl		76	24.9
	>500 cells/µl		105	34.4
Anemia status	Normal		220	72.1
	Anemic		85	27.9
Current/past OI in the past six months	No		178	58.4
	Yes	Problems	127	41.6
		Acute/chronic Diarrhea	45	14.8
		Tuberculosis	73	23.9
		Oral thrush	17	5.6
		Oral ulcer	8	2.6

	Pneumonia	8	2.6
	Zoster	3	1.0
	Pneumocystis carinii	1	0.3
ART regimens	1a (d4T+3TC+NVP)	7	2.3
	1c (AZT+3TC+NVP)	122	40.0
	1d (AZT+3TC+EFV)	14	4.6
	1e (TDF+3TC+EFV)	132	43.3
	1f (TDF+3TC+NVP)	26	8.5
	2b (TDF+3TC+LPV/r)	4	1.3
Duration of ART	< 6 month	38	12.5
	6 – 12 month	47	15.4
	1 – 3 years	53	17.4
	> 3 years	167	54.8
Regimen change	No	187	61.3
	Yes	118	38.7
Reasons for change	Toxicity/side effect	117	38.4
	New Tuberculosis	1	0.3
Drug adherence	Good	277	90.8
	Fair	20	6.6
	Poor	8	2.6

N.B: AZT= Zidovudine, d4T= Stavudine, EFV= Efavirenz, NVP= Nevirapine

TDF= Tenofovir, 3TC= Lamivudine, LPV/r = Lopinavir + Ritonavir

Table 3: Nutrition related characteristics of the study participants at Butajira Hospital, Southern Ethiopia, 2014, (n = 305)

Variables		Frequency (n)	Percent (%)
Change of feeding style after knowing HIV status	No	227	74.4
	Yes	75	24.6
Type of change of feeding style	Frequency	18	5.9
	Quality of food	75	24.6
	Quantity	3	1.0
Dietary counseling	No	143	46.9
	Yes	162	53.1
Organizational support other than medication	No	263	86.2
	Economical support	7	2.3
	RUTF	26	8.5
	Economical and RUTF	9	3.0
Household food insecurity status	Food secured	64	21.0
	Mildly food in secured	14	4.6
	Moderately food in secured	99	32.5
	Severely food in secured	128	42.0
Household dietary diversity	Inadequate	121	39.7
	Adequate	184	60.3

6.4. Intestinal parasite infection among the study participants

More than quarter (26.6%) of the study participants were co-infected with one or more intestinal parasites and six different types of intestinal parasitic species were identified. *Entanmoeba histolytica/dispar* accounted for 11.5% (n= 35) and that of Taenea species for 7.2% (n=22) followed by *Giardia lambelia* for 5.3 % (n=16) (Table 4).

Table 4: Intestinal parasites co-infection among the study participants at Butajira Hospital, Southern Ethiopia, 2014, (n = 305)

Intestinal parasites		Frequency (n)	Percent (%)
Negative		224	73.4
Positive		81	26.6
Protozoa's	*Entanmoeba histolytica/dispar* trophozoite	22	7.2
	Entanmoeba histolytica/dispar cyst	13	4.3
	Giardia lamblia trophozoite	14	4.6
	Giardia lamblia cyst	2	0.7
Helminthes	Tanea species	22	7.2
	Ascaris lumbricoides	9	3.0
	Strongyloid stercoralis	5	1.6
	Hookworm species	2	0.7
Multiple parasitic infections	*Entanmoeba histolytica/dispar* trophozoite + *Giardia lamblia* trophozoite	2	0.7
	Entanmoeba histolytica/dispar trophozoite + *Ascaris lumbricoides*	2	0.7
	Giardia lamblia trophozoite + Tanea species	1	0.3

6.5. Prevalence of malnutrition

The overall prevalence of malnutrition (BMI < 18.5 kg/m^2) among PLWHA receiving ART at Butajira hospital was 25.2% (95% CI: 20.0% – 30.2%). Mild, moderate and severe malnutrition was observed on 49 (16.1%), 19 (6.2%) and 9(3.0%) participants respectively (Figure 2). The mean BMI for male and female was 20.77 (SD ± 3.15) and 21.04 (SD ± 3.56) respectively. The prevalence of malnutrition among male patients was 25.9% (95% CI: 18.3% – 34.3%) but 24.9% (95% CI: 18.8% – 31.2%) among females. The prevalence of malnutrition was also different by the age of the study subjects. Among 77(25.2%) malnourished subjects, the age group 30 – 44 were mostly affected, 42 (13.8 %) followed by the age group above 44 years 29 (9.5%).

6.6. Factors affecting Malnutrition

In this study, both bivariate and multivariate logistic regression analysis was computed. However, on multivariate logistic regression analysis, out of eleven selected variables in

bivariate analysis, five variables (residence, eating difficulty, RUTF, anemia and intestinal parasitic infection) were significantly associated with malnutrition. Six variables that showed association on the bivariate model (age, educational status, gastrointestinal symptoms, diarrhea, HFIS and HDD) were not statistical associated with malnutrition in the multivariate (Table 5). In addition, being rural area dweller was significantly associated with malnutrition (P = 0.02). Patients living in rural area were two times more likely to be malnourished as compared to those living in urban areas (AOR=1.98; 95% CI: 1.10, 3.53). Eating difficulty was also positively associated with malnutrition (P= 0.002). Participants who had one or more eating difficulty were 2.69 times more likely to be malnourished as compared to those who were free of eating difficulty (AOR= 2.69; 95% CI:1.41, 5.11). RUTF was negatively associated with malnutrition. Individuals who were not taking RUTF were 82% times less likely to be malnourished than those who were taking RUTF (AOR= 0.18; 95% CI: 0.08, 0.40). Anemia was also positively associated with malnutrition (P= 0.03). Participants who were anemic were 1.94 more likely to be malnourished than those with normal hemoglobin level (AOR=1.94; 95% CI: 1.05, 3.57). Intestinal parasitic co-infection was also significantly associated with malnutrition. (P= 0.001). Participants who had one or more intestinal parasites were 2.85 times more likely to be malnourished as compared to those who were free of intestinal parasites (AOR=2.85; 95% CI:1.54, 5.27) (Table 5).

Table 5: Factors associated with malnutrition among PLWHA receiving ART at Butajira Hospital, Southern Ethiopia, 2014, (n= 305)

Predictors	Under-nutrition		COR (95%CI)	AOR (95% CI)	P- values
	Yes	No			
Age					
18 – 29	6	30	1		
30 – 44	42	143	1.47(0.57 - 3.76)		
> 44	29	55	2.64(0.98 – 7.06)		
Residence					
Urban	35	142	1	1	
Rural	42	86	1.98(1.17 – 3.34)	1.98(1.10 – 3.53)	0.02*
Educational status					
Unable to read and write	40	81	2.63(0.72 – 9.57)		
Able to read and write	12	26	2.46(0.60– 10.08)		
Primary education	16	64	1.33(0.35 - 5.14)		
Secondary education	6	41	0.78(0.17- 3.50)		
Tertiary education	3	16	1		
Eating difficulty					
Yes	29	41	2.76(1.56- 4.88)	2.69(1.41 – 5.11)	0.002*
No	48	187	1	1	
Gastrointestinal symptoms					
Yes	18	32	1.87(0.98 – 3.57)		
No	59	196	1		
Diarrhea					
Yes	12	16	2.45(1.10 – 5.43)		
No	65	212	1		
RUTF					
Yes	22	13	1	1	
No	55	215	0.15(0.07 – 0.3)	0.18(0.08 – 0.40)	0.00**
Anemia					
Yes	31	54	2.17(1.25 – 3.76)	1.94(1.05 – 3.57)	0.03*
No	46	174	1	1	
HFIS					
Food secure	6	58	1		

Mildly food insecure	2	12	1.61(0.29 – 8.97)		
Moderately food insecure	26	73	3.44(1.33 – 8.92)		
Severely food insecure	43	85	4.89(1.95 – 12.2)		
HDD					
Inadequate	37	84	1.59(0.94 – 2.67)		
Adequate	40	144	1		
Intestinal parasite					
Present	33	48	2.81(1.62 – 4.89)	2.85(1.54 – 5.27)	0.001**
Absent	44	180	1	1	

N.B: $\alpha = 0.05$, * shows significant, ** shows highly significant

Hosmer and lemeshow test was at $p = 0.39$

Stepwise (Backward LR) was used in logistic regression

7. Discussion

This study focused on assessing the prevalence of malnutrition and its associated factors among adult PLWHA receiving ART. In this study, the overall prevalence of malnutrition (25.2%) was relatively lower than other reports conducted in different parts of the world (37.2% - 43%) [24, 26, 30]. The prevalence of malnutrition was also reported different in different part of Ethiopia. For example, Hailemariam et al reported relatively a 12.3% prevalence of malnutrition at Dilla [21]. However, a relatively higher prevalence of malnutrition was reported at Tigray (42.3%) [35]. The result of the current study was relatively similar with previous reports conducted at Gondar and Bahir-Dar [33, 34]. The discrepancy of malnutrition among different parts of the country may reflect the existence of different socio-economic and other factors that are practiced by these communities probably as a result of different ethnic experiences. Moreover, the study conducted at Tigray was only on women patients which may raise the prevalence of malnutrition since women are biologically, socially and economically more vulnerable to both HIV/AIDS and malnutrition [41, 42]. women have lower muscle mass and greater amount of total body fat than men with an equivalent BMI, which may increase the prevalence of malnutrition, since sex and muscle mass can affect the relationship between BMI and body fat [43].

Patients living in rural area were two times more likely to be malnourished as compared to those living in urban areas. People living in rural area showed relatively higher prevalence of malnutrition compared with urban dwellers. It will not be unwise to expect lower socio-economic status, reduced awareness about nutrition, lower food access and diversity, and narrower availability of health, water, and sanitation services in rural dwellers than people living in urban in the study area as these are commonly observed in third world and developing countries.

Presence of eating difficulty was another significantly associated variable with malnutrition among PLWHA receiving ART. Participants who had one or more eating difficulty were 2.69 times more likely to be malnourished as compared to those who were free of eating difficulty. This finding is in accordance with the results of former studies conducted at Gondar and Bahir-Dar [33, 34]. Reduction of food consumption due to loss of appetite, vomiting and nausea due to the side effects of ART, swallowing difficulty due to oral thrush or ulcer leading to reduced energy intake and also may be the main reason why people lose weight among PLWHA [44] .

This study found a significant positive association between anemia and malnutrition. Participants who were anemic were 1.94 fold more likely to be malnourished than those with normal hemoglobin level. Similar reports were documented in a study conducted at Tigray [35]. This positive association of anemia with malnutrition might be due to alterations in bone marrow and spleen erythropoiesis, diminution in reticulocyte as a result of protein-energy malnutrition. Haemopoietic tissue has a high rate of regeneration and cellular proliferation, presents a high demand for protein for the process of haemopoiesis. Bone marrow atrophy is common in protein-energy malnutrition, which result from abnormalities of stem cells or defects in stromal cells, which would alter the haemopoietic microenvironment [45].

There was also a significant negative association betteween RUTF with malnutrition in the current study. Individuals who were not taking RUTF were 82% times less likely to be malnourished than those who were taking RUTF and this was also in accordance with previous reports [35]. However, the current result on the association of RUTF with malnutrition contradicts with a report from other countries such as Central Haiti [46] and Uganda [47]. A number of reasons can contribute for the difference including the study design. The former studies conducted in Central Haiti were prospective Cohort study, which have enough time to observe the potential effect of RUTF on that of malnutrition. On the other hand, the participants of the current study may not take RUTF properly due to sharing to their family members, selling to get money and they may not respond to RUTF due to recurrent opportunistic infections, clinical stages of disease and others.

The other pertinent finding of the current study was a highly significant positive association of intestinal parasites with malnutrition. Participants who had one or more intestinal parasites were 2.85 times more likely to be malnourished as compared to those who were free of intestinal parasites. This positive association might be due to nutrient demand of parasite itself, frequent episode of diarrhea and reduced appetite, blocking of the absorbing surface of the mucosa by adult worms and altered the absorption of nutrients [48, 49]. Many of the populations at high risk for HIV also live in highly endemic areas of intestinal parasitic infections, which are mainly acquired in child hood and remain as chronic infections into adult hood [50]. Several investigators reported lower levels of hemoglobin as a result of pathogenic intestinal parasitic infection [51]. *Entanmoeba histolytica* leads to necrosis of intestinal mucosa and bleeding;

Gardia lamblia to mala-absorption and Tricuris is suggested to associate with anemia mediating through iron deficiency caused by blood loss [52]. Infection by Hook worm causes iron deficiency anemia [53] and *Ascaris lumbricoids* is known to influence nutritional status, but its impacts on anemia are less clear [54].

8. Strength of the study

The strengths of this study were incorporated assessment of some pertinent variables such as intestinal parasites which were not examined on the level of malnutrition in previous similar studies and other medical related problems associated with malnutrition. Patients' medical charts and ART follow up data base combined with the primary data collected by structured interview administered questionnaire were used to avoid recall biases.

9. Limitation of the study

The limitation of the current study could be the study design as the cross-sectional study design by its nature limits information about cause and effect relationship in the majority of predictors.

In this study, only anthropometric measurement (BMI) was used to assess the nutritional status of participants, which assess mainly the public health burden of malnutrition. The study didn't add some laboratory methods used to assess nutritional status like micronutrient deficiencies.

Assessment of HFIS and HDD depends on the past one month period and 24 hour recall method, respectively; they may create a possibility of recall bias.

10. Conclusion

This study revealed that malnutrition is high among PLWHA receiving ART. People living in rural area and patients with eating difficulty, anemia, RUTF, and intestinal parasite co-infection were the most significant factors affecting malnutrition.

11. Recommendation

To Federal Ministry of Health (FMOH) and other concerned Non-Governmental Organizations

- Attention should be given to strengthening household food security status of patients besides nutritional support and ART care.

To clinicians and other health workers

- Consistent and proper detection of intestinal parasites and treat promptly even if the patients are being asymptomatic or do not have any complaints, in addition to deworming.
- Regular check up of hemoglobin concentration, diagnosing anemia, identifying the underlying cause of anemia and intervention should be taken as early as possible.
- Due attention should be given to identify the cause of poor dietary consumption (eating difficulty) and treat promptly.

To researchers

- In this study, to assess the effect of RUTF on the level of malnutrition was very difficult. Prospective Cohort study and randomized controlled experimental study design are recommended to assess the effect of RUTF on nutritional status in PLWHA receiving ART.

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Annex-1: Questionnaires

Consent form

Questionnaire prepared for collection of data on assessment of malnutrition and associated factors in adult HIV/AIDS clients receiving ART at Butajira hospital, Southern Ethiopia.

Identification_____

Date of interview_____

Time at the beginning of the interview_____

Introduction

Hello! Madam/sir

My name is_____, I am data collector for the research by a team of researchers from university of gondar. The purpose of this quastionnaire is to gather information on prevalence and associated factors of malnutrition among adult HIV/AIDS clients following HIV care in Butajira hospital. the research will be beneficial to those adults on HIV/AIDS care and support.

Confidentiality and informed consent statement

I am going to ask you a series of quastions which will take few minutes and then there will be measured your weight and height, and stool will be collected and investigated for intestinal parasites. Your answers to those quastions will remain confidential. I will not write your name in the quastionnare. You can refuse to any of the qustions and you can interrupt at any point in the interview. your role in the success of the research is of immense importance and we appreciate your contribution to the research. Your participation in this study does not involve any direct risk or benefit for you but is very useful since your answers, as well as those other participant, will help to those living with HIV/AIDS nutrional care and support. Would you like to participate in the study?

A. Yes_____ B. No_____

Thank you for being voluntary to participate in the study!

Result code_____ (1. completed, 2. Partially completed, 3. Refused, 4. Other)

Checked by supervisor, name and signature_____

Patient ID._____ Unique ART no_____

Section one: Socio-demographic background

S.NO.	Questions	Response categories	remarks
101	Sex	1. Male 2. Female	
102	Age	_____ years	
103	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others specify_____	
104.	Ethnicity	1. Gurage 2. Silitie 3. Amhara 4. Oromo 5. Tigrie 6. Other specify_____	
105.	Marital Status	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated	
106.	Family size	_____	
106.	Residence	1. Urban 2. Rural	

107.	Educational Status	1. unable to read and write 2. able to read and write 3. primary education 4. secondary education 5. tertiary education	
108.	Occupation	1. Governmental employer 2. Self employer 3. Farmer 4. Merchant 5. Daily laborer 6. Other specify_____	
109.	Monthly income	_____	

Section two: Clinical characteristics of clients

S. NO.	Questions	Response categories	remark
201.	When did you first test positive for HIV?	_____	
202.	Do you have any changes on feeding style after knowing you HIV status?	0. No (skip to 203) 1. Yes	
202.a	If the answer is yes for question 202, what is the change on feeding style?	1. Frequency 2. Quality 3. Quantity 4. Other specify_____	
203.	Do have any problem with eating?	0. No (skip to 204) 1. Yes	
203.a	If the answer is yes question 203, what kind of problems do you have?	1. Loss of appetite 2. Vomiting 3. Nausea 4. Swallowing difficulty 5. Other specify_____	

204.	Do you have any gastrointestinal symptoms?	0. No (skip to 205) 1. Yes	
204.a	If the answer is yes question 204, what kind of gastrointestinal symptoms?	1. Diarrhea 2. Indigestion 3. Constipation 4. Other specify_____	
205.	Do you have any chronic diseases other than HIV/AIDS?	0. No (skip to 206) 1. Yes	
205.a	If yes to question 205, which one is do you have?	1. Tuberculosis 2. Diabetes mellitus 3. Renal disease 4. Heart disease 5. Other specify_____	
206.	Have you been given dietary counseling?	0. No 1. Yes	
207.	Is there any organization that supports you?	0. No 1. Yes	
208.	What supports did you get?	1. Economic 2. RUTF 3. Medication and kits 4. Other specify_____	
209.	Who provide you the support?	1. Government organizational 2. Non-governmental organization 3. other specify_____	

Section three: Data will be extracted from patient medical chart and anthropometry data

s.no	Questions	Response categories	remark

301.	Date of the patient first came to the ART clinic	_____	
302.	Current/past opportunistic infections	0. No (skip to 303) 1. Yes	
302.a	If yes to question 302, what kind of opportunistic infection?	1. Chronic/acute diarrhea 2. Pulmonary tuberculosis 3. Thrush (oral, vaginal) 4. Ulcer (oral, genital) 5. Zoster 6. Bacterial pneumonia 7. Toxoplasmosis 8. Other specify_____	
303.	Current patient's WHO clinical stage	1. stage I 2. stage II 3. stage III 4. stage IV	
304.	Current patient's CD4+ cell count	_____	
305.	Current patient's hemoglobin level	_____	
306.	Take the weight and record to the nearest 0.1kg	_____	
307.	Take the height and record to the nearest 0.5cm	_____	
308.	Current Patient's BMI (Kg/m^2)	_____	

Section four: Questions for patients on ART status

S.NO	Questions	Response categories	remark
401.	Started date of ART treatment	_____	

402.	What is the current ART regimen ?	_____	
403.	Was there any regimen change of the patient?	0. No 1. Yes	
403.a	If the answer is yes to question 403, what was the reason?	1. Toxicity/ Side effect 2. Due to new tuberclosis 3. Immunologic failure 4. Virology failure 5. Clinical failure 6. pregnancy 7. Other specify____	
404.	Drug adherence	1. Good 2. Fair 3. Poor	
404.a	If fair or poor adherence, what was the reason?	1. Toxicity/side effect 2. Forgot 3. Stigma, discloser 4. Too ill 5. Felt better 6. Lost/ran out of pills 7. Others	

Section 5: Household Food Insecurity Access Scale (HFIAS) Measurement Tool

S.N	Questions	Response categories	
501.	In the past four weeks, did you worry that your household would not have enough food?	0 = No (skip to Q502) 1=Yes	
501.a	How often did this happen?	1 = Rarely (once or twice in the	

		past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
502.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	0 = No (skip to Q503) 1=Yes	
502.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
503.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	0 = No (skip to Q504) 1 = Yes	
503.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
504.	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	0 = No (skip to Q505) 1 = Yes	
504.a	How often did this happen?	1 = Rarely (once or twice in the	

		past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
505.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	0 = No (skip to Q506) 1 = Yes	
505.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
506.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	0 = No (skip to Q7) 1 = Yes	
506.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
507.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	0 = No (skip to Q508) 1 = Yes	
507.a	How often did this happen?	1 = Rarely (once or twice in the	

		past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
508.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	0 = No (skip to Q509) 1 = Yes	
508.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	
509.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	0 = No 1 = Yes	
509.a	How often did this happen?	1 = Rarely (once or twice in the past four weeks) 2 = Sometimes (three to ten times in the past four weeks) 3 = Often (more than ten times in the past four weeks)	

Section 6: Dietary Diversity Questionnaire

S.N	food group	Examples	yes=1 no=0

601.	Cereals	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products)	
602.	white roots and tubers	white potatoes, white cassava, kocho or other foods made from roots	
603.	Vegetables	red sweet pepper, dark green leafy vegetables, including wild forms + locally available vitamin a rich leaves such as cassava leaves, spinach, tomato, onion	
604.	Fruits	ripe mango, ripe papaya, dried peach, and 100% fruit juice made from these + other locally available vitamin A rich fruits, other fruits, including wild fruits and 100% fruit juice made from these	
605.	Meat	liver, kidney, heart or other organ meats or blood-based foods, beef, pork, lamb, goat, chicken	
606.	Eggs	eggs from chicken	
607.	fish and seafood	fresh or dried fish	
608.	legumes, nuts and seeds	dried beans, dried peas, lentils, nuts, seeds or foods made from these (eg. hummus, peanut butter)	
609.	milk and milk products	milk, cheese, yogurt or other milk products	
610.	oils and fats	oil, fats or butter added to food or used for cooking	
611.	Sweets	sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes	
612.	spices, condiments, beverages	spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages	

Section seven: Identification of Intestinal parasites using microscope

701.	Intestinal parasites	0. Absent 1. Present	
701.a	Protozoan	*1. Entanmoeba histolytica/dispar trophozoit* *2. Entanmoeba histolytica/dispar cyst* *3. Giardia lamblia trophozoit* *4. Giardia lamblia cyst* *5.* Other specify_____	
701.b	Helminthes	*1. Ascaris lumbricoides* *2. Strongyloid stercoralis* *3. Schistosoma mansoni* 4. Hookworm species 5. Tinea species 6. Other specify_____	

Annex-2: Questionnaires Amharic version (የአማረኛ መጠይቅ)

በቡታጅራ ሆስፒታል በፀረ ኤች አይ ቪ ክልኒክ ውስጥ የመድሃኒት ክትትል ላይ ባሉ የኤች አይ ቪ/ኤድስ ህሙማን ላይ የምግብ እጥረት እና ከምግብ እጥረት ጋር የተያያዙ ጉዳዮችን ለማጥናት የተዘጋጀ መጠይቅ፡፡

መለያ ቁጥር ……..

ቀን ……..

መጠየቁ የተጀመረበት ሰዓት……..

<u>መግቢያ</u>

ጤና ይስጥልኝ!

ስሜ ……. ይባላል፡፡ የኔ የስራ ድርሻ በጎንደር ዩኒቨርስቲ የምርምር ባለሙያዎች ቡድን አማካኝነት በቡታጅራ ሆስፒታል ላይ በሚደረገው ጥናት መረጃ ሰብሳቢ ነኝ:: የመጠይቁ ዓላማ የምግብ እጥረት ደረጃና ከዚህ ጋር የተያያዙ ጉዳዮች መረጃ ለመሰብሰብ ነው፡፡ የዚህ ምርምር ውጤት ወደፊት ለኤች አይ ቪ ህሙማን ድጋፍ እና እንክብካቤ ጠቀሜታ ይኖረዋል ፡፡

በመጠየቁ ሂደት አንዳንድ ጥያቄዎች፣ የቁመትና የክብደት መለካት፣ የሰገራ ምርመራም ይኖራል፡፡ ሆኖም የተወሰነ ደቂቃ ይወስዳል ፡፡ ይህ የሚሰጡት መልስ ለምርምር መሳካት እጅግ ተቃሚ ነው፡፡ ይህ መጠይቅ በሚሞላበት ጊዜ ለመረጃ ሚስጥራዊነት ሲባል ስምዎትን አንፅፍም ፡፡ በመጠየቁ ወቅት በማንኛውም ሰዓት መጠየቁን ማቋረጥ ይችላሉ፡፡ የርሶዎ ሚና ለምርምሩ መሳካት እጅግ ተቃሚ ነው እንዲሁም ለምርምሩ ለሚያደርጉልን አስተዋፆኦ እናደንቃለን ፡፡

በዚህ ጥናት ወደፊት እርሶዎ ሌሎች ተሳታፊዎች ምንም እንኳን በቀጥታ ተጠቃሚ ባይሆንም ከኤች አይ ቪ ጋር ለሚትኖሩት ህሙማን እንክብካቤ ና መሻሻል ጠቀምታ ይኖረዋል ፡፡ በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ነዎት?

ሀ አዎ ለ/ አይደለም

በጥናቱ ለመሳተፍ ፍቃደኛ ስለሆኑ እናመሰግናለን!

ክፍል አንድ፡ አጠቃላይ ስነ - ማህበራዊ ሁኔታ

ተ.ቁ	ጥያቄዎች	አማረጭ መልሶች	አስተያየት
101	ፆታ	1. ወንድ 2. ሴት	

102	እድሜ	በአመት _____	
103	ሐይማኖት	1. አርቶዶክስ 2. ሙስሊም 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ ካላ ይገልጽ_____	
104	ብሔር	1. ጉራጌ 2. ስልጤ 3. አማራ 4. አሮሞ 5. ትግሬ 6. ሌላ ካለ ይገለጽ……	
105	የትዳር ሁኔታ	1. ያላገቡ 2. ባለትዳር 3. አግብተው የፈቱ 4. ባል / ሚስት የሞተባቸው 5. ተለያይተው የሚኖሩ	
106	በቤት ዉስጥ ያሉት የቤተሰብ ብዛት	.....	
107	የመኖሪያ ስፍራ	1. ከተማ 2. ገጠር	
108	የትምርት ሁኔታ	1. ማንበብና መፃፍ የማይችሉ 2. ማንበብና መፃፍ የሚችሉ 3. አንደኛ ደረጃ ትምህርት 4. ሁለተኛ ደረጃ ትምህርት 5. ከፍተኛ ደረጃ ትምህርት	
109	የስራ ሁኔታ	1. የመንግስት ሰራተኛ 2. የግል ሰራተኛ 3. አርሶ አደር 4. ነጋዴ 5. የቀን ሰራተኛ	

		6. ሌላ ካለ ይገለጽ……	
110	የወር ገቢዎት ምን ያህል ነው?	……	

ክፍል ሁለት: የኤች አይቪን እና የበሽታዎች በተመለከተ

ተ.ቁ	ጥያቄዎች		
201	ለመጀመሪያ ጊዜ ኤች አይ ቪ በደምዎት መኖሩን ያወቁት መቼ ነው?	……..	
202	ኤች አይ ቪ በደምዎት መኖሩን ካወቁ በኋላ ያደረጉት ያመጋገብ ለውጥ አለ?	0. የለም (ወደ 203 ይሂዱ) 1. አዎ	
202.ሀ	ለጥያቄ ቁጥር 202 መልሶዎ አዎ ከሆነ ምን አይነት ያመጋገብ ለውጥ ነው?	1. ቶሎ ቶሎ መመገብ 2. ጥራት ያለው ምግብ መመገብ 3. ብዛት ያለው ምግብ መመገብ 4. ሌላ ካለ ይጥቀሱ ……..	
203	ሲመገቡ የሚገጥመዎ ችግር አለ?	0. የለም (ወደ 204 ይሂዱ) 1. አዎ	
203.ሀ	ለጥያቄ ቁጥር 203 መልሶዎ አዎ ከሆነ ችግሮዎት ምንድን ነው?	1. የምግብ ፍላጎት መቀነስ 2. ማስመለስ 3. የምግብ ፍላጎት መቀነስ/ ማስመለስ 4. የመዋጥ ችግር 5. ሌላ ካለ ይጥቀሱ…….	
204	ከሆድ ዕቃ ጋር የተያያዘ በሽታ አለበዎት?	0. የለብኝም(ወደ 205 ይሂዱ) 1. አዎ	
204.ሀ	ምን አይነት የሆድ ዕቃ በሽታ አለቦዎት?	1. ተቅማጥ 2. መግብ አለመፈጨት 3. ሆድ ድርቀት 4. ሌላ ካለ ይጥቀሱ…..	
205	ለብዙ ጊዜ የቆየ በሽታ አለቦዎት?	0. የለም(ወደ 206 ይሂዱ) 1. አዎ	
205.ሀ	ለጥያቄ ቁጥር 205 አዎ ከሆነ ከሚከተሉት ውስጥ	1. ሳንባ ነቀርሳ	

	የትኛው ነው?	2. ስኳር 3. ኩላሊት በሽታ 4. የልብ በሽታ 5. ሌላ ካለ ይጥቀሱ	
206	በቆይታዎ ወቅት ስለ አመጋገቦዎት የተሰጠዎት የምክር አገልግሎት አለ?	0. የለም 1. አዎ	
207	ኤች አይ ቪ በደሞዎት በመኖሩ የሚያገኙት ድጋፍ እና እንክብካቤ አለ?	0. የለም 1. አዎ	
207.ሀ	የሚደረግለዎት ድጋፍና እንክብካቤ ምንድን ነው?	1. የገንዘብ 2. የምግብ 3. ሌላ ካለ ይጥቀሱ……	
207.ለ	ድጋፍና እንክብካቤ ሚያደርግሎዎት ድርጅት ማን ነው?	1. መንግስት 2. መንግስታዊ ያልሆነ ድርጅት 3. ማህበራዊ የሆነ ድርጅት 4. ሌላ ካለ ይጥቀሱ……	

ክፍል ሶስት: ከህሙማኑ መዝገብ በማየት፣ ክብደትና ቁመት በመለካት የሚሞላ

ተ.ቁ			
301	የኤች አይ ቪ ኤድስ እሙማኑ ወደ ፀረ ኤች አይ ቪ ክፍል የመጣበት ጊዜ	……. ቀን …… ወር ……. ዓ.ም	
302	አሁን/ በፊት ተጓዳኝ ህመም ነበረበት	0. የለበትም(ወደ 303 ይሂዱ) 1. አለበት	
302.ሀ	ተጓዳኝ ህመሙ ምን ነበር?	1. የቆየ ተቅማጥ 2. ሳንባ ነቀርሳ 3. የአፍ ዉስጥ ቁስል 4. ሌላ ካለ ይጥቀሱ……	
303	የህመሙ ደረጃ በአለም ጤና ድርጅት መሰረት	1. ደረጃ 1 2. ደረጃ 2 3. ደረጃ 3	

		4. ደረጃ 4	
304	አሁን የህሙማኑ CD4 counts ስንት ነው	……..	
305	አሁን የህሙማኑ hemoglobin መጠን ስንት ነው	……	
306	አሁን ያለውን የህሙማኑ ክብደት በኪሎ ግራም መዝነው፣ 0.1 ኪ.ግ አስጠጋግተው ያስቀምጡት	…….	
307	አሁን ያለው የህሙማኑ ቁመት በሲኒቲ ሜትር ለክተው 0.5 ሴ.ሜ አስጠጋግተው ያስቀምጡ	…….	
308	BMI (ኪ.ግ/ሜ^2)	…….	
ክፍል አራት፡ የፀረ - ኤች አይ ቪ መድሀኒት ህክምና ላይ የተመለከተ ጥያቄዎች			
401.	የፀረ ኤች ቪ መድሀኒት ህክምና ከጀመሩ ስንት ጊዜያት ነው?	……	
402.	ህሙማኑ በአሁኑ ጊዜ የሚጠቀመው የፀረ ኤች ቪ መድሀኒት	…….	
403	ህሙማኑ በቆይታው ወቅት የተደረገለት የፀረ ኤች አይ ቪ መድሃኒት ለውጥ ነበር	0. የለም 1. አዎ	
403.ሀ	የፀረ ኤች አይ ቪ መድሃኒት የተቀየረላቸው ከሆነ ምክንያቱ ምን ነበር?	1. የመድሃኒቱ አለመስማማት/የጎን ጉዳት 2. በሳንባ በሽታ 3. ሌላ ካለ ይጥቀሱ……..	
404	የመድሃኒት ክትትል	1. ጥሩ 2. መካከለኛ 3. አነስተኛ	
404.ሀ	የመድሃኒት ክትትሉ መካከለኛ ወይም አነስተኛ ከሆነ ምክንያቱ ምን ነበር?	1. የመድሃኒቱ አለመስማማት/የጎን ጉዳት 2. የመርሳት ችግር 3. አድሎ እና መገለልን በመፍራት	

		4. በጠና ህመም 5. የተሻልኝ ስለመሰለኝ 6. መድሃኒቱ ስላለቀብኝ 7. ሌላ ካለ ይጥቀሱ……..	

ክፍል 5፡ የቤት ዉስጥ በቂ የምግብ መጠን መለኪያ ጥያቄዎች

501	ላለፉት አራት ሳምንታት በቤት ዉስጥ በቂ ምግብ ላይኖር ይችላል በማለት ተጨንቀዋል?	0. አይደለም (ወደ 502 ይሂዱ) 1. አዎ	
501.ሀ	መቸ መቸ ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛዉን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
502	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በገንዘብ እጥረት ምክንያት ምትፈሊጊውን/ ምትፈልገውን ምግብ መብላት ያልቻልክበት ቀናት ነበር?	0. አይደለም (ወደ 503 ይሂዱ) 1. አዎ	
502.ሀ	መቸ መቸ ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛዉን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
503	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በገንዘብ እጥረት ምክንያት ዉስን የምግብ አይነት ለመብላት ተገድህል?	0. አይደለም (ወደ 504 ይሂዱ) 1. አዎ	
503.ሀ	መቸ መቸ ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ	

		ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
504	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በገንዘብ እጥረት ምክንያት መብላት ማትፈልገውን ጥቂት ምግብ ለመብላት ተገድህል?	0. አይደለም (ወደ 505 ይሂዱ) 1. አዎ	
504.ሀ	መች መች ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
505	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በቂ ምግብ ባለመኖሩ ምክንያት መብላት ከምትፈልገው በታች ምግብ ለመብላት ተገድህል?	0. አይደለም (ወደ 506 ይሂዱ) 1. አዎ	
505.ሀ	መች መች ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
506	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በቂ ምግብ ባለመኖሩ ምክንያት በቀን ውስጥ ትንሽ ምግብ ለመብላት ተገድህል?	0. አይደለም (ወደ 507 ይሂዱ) 1. አዎ	
506.ሀ	መች መች ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ	

		አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
507	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በገንዘብ እጥረት ምክንያት ምንም አይነት ምግብ ሳይበሉ የቆዩበት ቀን ነበር?	0. አይደለም (ወደ 508 ይሂዱ) 1. አዎ	
507.ሀ	መቸ መቸ ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
508	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በቂ ምግብ ባለመኖሩ ምክንያት በርሃብ የተኛበት ምሽት አለ	0. አይደለም (ወደ 509 ይሂዱ) 1. አዎ	
508.ሀ	መቸ መቸ ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	
509	ላለፉት አራት ሳምንታት በቤት ዉስጥ አንተ /አንቺ ወይም የቤተሰብዎ አባላት በቂ ምግብ ባለመኖሩ ምክንያት ቀኑን እና ምሽቱን ሙሉ ምንም አይነት ምግብ ሳትበላ ያደርክበት ቀን ነበር?	0. አይደለም 1. አዎ	

509.ሀ	መች መች ጊዜ (ምን ያህል ቀናት) ነው የተከሰተው?	1. ከስንት አንዴ(ከአራቱ ሳምንታት ዉስጥ አንዴ ወይም ሁለቴ) 2. አልፎ አልፎ(ከአራቱ ሳምንታት ዉስጥ ከ3-10 ቀናት) 3. አብዛኛውን ቀናት(ከአራቱ ሳምንታት ከ10 ቀናት በላይ)	

ክፍል 6፡ በዚህ 24 ሰዓት ዉስጥ የተመገበው የምግብ አይነት መለኪያ ጥያቄዎች

ተ.ቁ	የምግብ ምድብ	ለምሳሌ	0.አይደለም 1.አዎ
601	የጥራጥሬ ዘር	በቆሎ፣ሩዝ፣ስንዴ፣ማሽላ፣ወይም ከነዚህ የጥራጥሬ ዘሮች የተሰሩ ምግቦች(ለምሳሌ፡- ዳቦ፣ገንፎ፣ዳቦ ቆሎ)	
602	የስራስር ምግቦች	ድንች፣ስካር ድንች፣ ቆጮ ወይም ከነዚህ ስራስር የተሰሩ ምግቦች	
603	አትክልቶች	ቀይ በርበሬ፣ቆስጣ፣ሰላጣ፣ሽንኩርት፣ቲማቲም	
604	ፍራፍሬዎች	ማንጎ፣ፓፓያ፣ቡርትካን ወይም 100% ከነዚህ ፍራፍሬዎች ተሰሩ ጭማቂ	
605	ስጋ	የከብት ስጋ፣የፍየል ስጋ፣የበግ ስጋ፣የዶሮ ስጋ ወይም ከነዚህ እንሰሳት ውስጥ የሚገኙ የውስጥ አካላቶች(ለምሳሌ፡- ጉበት፣ኩላሊት፣ልብ)	
606	እንቁላል	የዶሮ እንቁላል	
607	የዓሳ ምግቦች	ያልቆየ የደረቀ ዓሳ	
608	ባለሁለት ግርባብ እህሎች	ባቄላ፣አተር፣ምስር፣አቾሎኒ፣ወይም ከነዚህ እህሎች የተሰሩ ምግቦች	
609	ወተት እና የወተት ውጤቶች	ወተት፣አይብ፣እርጎ	
610	የዘይት እና የቅባት ምግቦች	ዘየት፣ቅቤ የተጨመረባቸው ምግቦች	
611	ጣፋጭ ምግቦች	ስኳር፣ማር፣ጣፋጭ ጭማቂዎች፣ቸኮሌት፣ከረሜላ፣ኬክ	
612	ቅመማቅመሞች እና መጠጦች	ጨው፣ቡና፣ሻይ፣የአልኮል እና የለስላሳ መጠጦች	

ክፍል 7፡ የስገራ ምርምራ በማድረግ የአንጀት ጥገኛ ተዋስያኖቹን መለየት

701	የአንጀት ጥገኛ ተዋስያን አለበት?	0. የለበትም 1. አለበት	
701.ሀ	Protozoan	1. *Entanmoeba histolytica/dispar trophozoit* 2. *Entanmoeba histolytica/dispar cyst* 3. *Giardia lamblia trophozoit* 4. *Giardia lamblia cyst* 5. Other specify_____	
701.ለ	Helminthes	1. *Ascaris lumbricoides* 2. *Strongyloid stercoralis* 3. *Schistosoma mansoni* 4. Hookworm species 5. Tinea species 6. Mixed infections 7. Other specify_____	

ስለሰጡኝ መልስ አመሰግናለሁ!

የመረጃ ሰብሳቢው ስም …….. ፊርማ …… ቀን ……..

የዋና ተመራማሪ ስም …… ፊርማ ……. ቀን ……

የተቆጣጣሪ ስም……. ፊርማ …… ቀን…….

Annex-3: Laboratory data collection procedures and format

Direct faecal smears-saline and wet mount preparations

Material and reagents:

1. Wooden applicator sticks
2. Slide(75x25mm)
3. Cover slips
4. Pen and markers
5. Isotonic saline solution (0.85%)
6. Lugol's iodine(1%solution)

Procedure:

1. Write the patients identification number and date at the left hand end of the slide.
2. Place a drop of saline in the center of the left half of the slide and place a drop of iodine solution in the center of the right half of the slide.
3. With an applicator sticks pick up a small portion of faeces (approximately 2mg) and add it the drop of saline: add a small portion of iodine.mix the faeces with the drops to form suspensions.
4. Cover each drop with a cover slip by holding the cover slip at an angle. Touch the edge of the drop and gently lowering the cover slip on to the slide.
5. Examine the preparations with the 10x objectives or, if needed for identification, higher laterally.

Formal-ether concentration technique

Materials and reagents:

Funnel	Conical centrifuge	Strainer (gauze)	10% formalin
Ethyl acetate/ Ether	Applicator stick	Slide	Cover slide
Microscope	Normal saline	Centrifuge	Stopper

Procedure:

1. Mix the specimen well.
2. Strain 5 ml of the fecal suspension (more or less depending on its consistency) through wetted cheesecloth-type gauze placed over a disposable paper funnel into a 15 ml conical centrifuge tube.
3. Add 0.85% saline or 10% formalin through the debris on the gauze to bring the volume in the centrifuge tube to 15 ml.
4. Centrifuge at 500× *g* for 10 minutes.
5. Decant supernatant. Add 10 ml of 10% formalin to the sediment and mix thoroughly with wooden applicator sticks.
6. Add 4 ml of ethyl acetate, stopper the tube, and shake vigorously in an inverted position for 30 seconds. Carefully remove the stopper.
7. Centrifuge at 500 × *g* for 10 minutes.
8. Layer will be seen according to the density (ether, debris, formalin and sediment)
9. Plug of debris from the top of the tube by ringing the sides with an applicator stick.
10. Decant the top layers of supernatant.
11. Use a cotton-tipped applicator to remove debris from sides of the centrifuge tube.
12. Resuspend the sediment perform wet mount

Annex-4: Information sheet and consent form

Title of the research : prevalence of malnutrition and its associated factors among adult PLWHA receiving ART at Butajira Hospital, Southern Ethiopia.

Name of principal investigator: Dereje Gedle

Name of organization: Gondar University, College of Medicine and Health Science, School of Biomedical and Laboratory Sciences.

Tel: +251 913190403

Email address: drakselina@yahoo.com

Advisors: Dr. Baye Gelaw

: Mr. Dagnachew Muluye

: Mr. Molla Mesele

This Information sheet and consent form prepared by University of Gondar College of Health Science Biomedical and Laboratory Science student and advisors.

Introduction

This information sheet and consent form is prepared with the aim of explaining the research project that you are asked to join by a group of research investigators. The main aim of the research project is to assess malnutrition among PLWHA receiving ART care and associated factors at Butajira hospital, Southern Ethiopia. The investigators include final year master of infectious and tropical diseases candidate Dereje Gedle and the advisors Dr.Baye Gelaw and Mr. Dagnachew Muluye from School of Biomedical ond Laboratory Science, College of Medicine and Health Science, University of Gondar.

Purpose of the research

The aim of this study is to assess prevalence of malnutrition among adult PLWHA receiving ART care and associated factors at Butajira Hospital, South Ethiopia.

Procedure

In order to assess malnutrition in adult PLWHA and associated factors with it, we invite you to take part in our project. If you are willing to participate in our project you need to understand and sign the consent form. Then you will be requested to give your response to the data collectors.

For this questionnaires based study, participants are all adult PLWHA receiving ART care at Butajira hospital, Southern Ethiopia. All the responses given by the patients and the results obtained will be kept confidential using coding system whereby no one will have access it.

Risk and/or discomfort

By participating in this research project you may feel that it has some discomfort specially on wasting your time (about 20 minute) but this may not be too much as you are coming to this clinic for routine HIV treatment and care by comparing its potential benefits contributing to prevent morbidity and mortality in PLWHA. There is no risk/harm to you by participating in this research project.

Benefits

If you participate in this research project there may not be direct benefit to you but your participation is likely to help us the extent of malnutrition and factors associated with it in people living with HIV/AIDS. Furthermore, the information obtained you will be used for planning and implementation of nutritional care and support for PLWHA.

Incentives/payment for participating

You will not be provided any incentives or payment to take part in this study.

Confidentiality

The information collected from this research project will be confidential. Information collected about you will be stored in a file which will not have your name on it but a code number assigned to it and will be kept in a locked cabinet so that no one except the investigator will have access to it.

Right to refuse or withdraw

You have the full right to refuse from participating in this research (you can choose not to respond all or some of the questions) if you don't wish to participate; and this will not affect your treatment or health services you get at this hospital in any way. You have also the full right to withdraw from this study at any time you wish, without losing any of your rights as a patient in the hospital.

Person to contact

This research project will be reviewed and approved by ethical committee of the University of Gondar. If you want to know more information you can contact the committee through the address below. If you have any question you can contact any of the following individuals and you may ask at any time you want.

1. Dereje Gedle: School of biomedical and laboratory science, CMHS, university of Gondar
   Tel: + 251 913190403
2. Dr. Baye Gelaw: School of biomedical and laboratory science, CMHS, university of Gondar
   Tel: + 251 919703723
3. Mr. Dagnachew Muluye: School of biomedical and laboratory science, CMHS, university of Gondar
   Tel: + 251 918031335
4. Mr. Molla Mesele: Institute of public health, CMHS, university of Gondar
   Tel: + 251 920254664

Consent form

I the undersigned have been informed that the interview is conducted to gather information about prevalence of malnutrition in PLWHA receiving ART, the government, and health facilities involved in HIV/AIDS care and support to individuals living with HIV/AIDS. I also agreed about the confidentiality of the response to be at a highest possible level.

Signature of participant: _____

Name and signature of data collector:_____

Annex-5: Information sheet and consent form Amharic Version (የምርምር/ጥናት ማብራሪያና የስምምነት መግለጫ ቅጽ)

የምርምር/ጥናት ርዕስ

በደቡብ ኢትዮጵያ ቡታጅራ ሆስፒታል በኤች አይ ቪ አድስ ህሙማን ላይ የምግብ እጥረትና ተዛማችነት ያላቸውን ምክንያቶችን ለማጥናት የሚካሄድ ጥናት ነው ::

የዋና ተመራማሪ ስም ደረጀ ገድለ

አድራሻ ጎንደር ዩኒቨርሲቲ የህክምናና ጤና ሳይንስ ኮሌጅ

ስ.ቁ 0913190403

ኢሜል drakselina@yahoo.com

አማካሪዎች ፡ ዶ/ር ባዬ ገላው

፡ አቶ ዳኛቸው ሙልዬ

፡ አቶ ሞላ መሰለ

ይህ ማብራሪያና የስምምነት መግለጫ ቅፅ የተዘጋጀው በጎንደር ዩኒቨርሲቲ ህክምናና ጤና ሳይንስ ኮሌጅ ድህረ ምረቃ ተማሪና በጎንደር ዩኒቨርሲቲ አማካሪ አማካኝነት ነው ::

መግቢያ

ይህ በደቡብ ክልል ኢትዮጵያ በቡታጅራ ሆስፒታል በ ኤች አይ ቪ ኤድስ ህሙማን ላይ የምግብ እጥረትና ተዛማች ምክንያቶችን ለማጥናት የሚካሄድ ሲሆን በሳንደር ጤና ሳይንስ ኮሌጅ የመጨረሻ አመት የሁለተኛ ድግሪ ተማሪ በሆነው በደረጀ ገድለ እና በአማካሪዎቹ ዶ/ር ባዬ ገላውና እና ዳኛቸው ሙልዬ የሚካሄድ ጥናት ነው፡፡

የምርምሩ አላማ

የዚህ ጥናት ዋና አላማ በደቡብ ክልል ቡታጅራ ሆስፒታል ላይ በኤች አይ ቪ ኤድስ ህሙማን የምግብ እጥረት እና ተዛማችነት ያለቸውን ነገሮች ለማወቅ የሚደረግ ጥናት ነው ::

ያሰራር ሂደት

የኤች አይቪ ኤድስ ህሙማን የምግብ እጥረት እና ለምግብ እጥረት የሚያጋልጡ ጉዳዮች በሚዳስሰው ጥናት እርሶዎ እንዲሳተፉ ጋብዘነዎታል ::

በዚህ ጥናት ውስጥ ለመሳተፍ ከተስማሙ ስምምነቱን በደንብ በመረዳት ከዚያ በመቀጠል በጥናቱ መረጃ ሰብሳቢዎች ለሚጠየቁት ጥያቄ እንዲመልሱ ፍቃደኝነቶዎ ይጠየቃሉ፡፡

በዚህ ጥናት የሚሳተፉት በሆስፒታሉ የፀረ- ኤች አይ ቪ መድሃኒት መውሰድ የጀመሩ ላይ ሲሆኑ የሚሰጡት መልስም ሆነ የሚገኘው ውጤት በሚስጥር ይጠበቃል፡፡

ሊከሰቱ የሚችሉ ስጋቶችና ምቾት መጉደሎች

በዚህ ጥናት መሳተፎዎት ምንልባት ጊዜዎን ሊሻማቦዎት ይችል ይሆናል :: ነገር ግን ዘወትር ወደ ሆስፒታል ለህክመና ከመላለሰዎና የጥናቱ ውጤት ወደ ፊት ለህሙማን በህመም ከመሰቃየት እና ከሞት ለመከላከል ከሚሰጠው ጥቅም አንጻር ችግሩ ይህን ያህል አይደለም በዚህ ጥናት መሳተፎዎ ለምንም አይነት ስጋት አያጋጥምዎትም ::

ጥቅሞች

በዚህ ጥናት መሳተፎ የተለየ ጥቅም አያገኙም ነገር ግን በጥናቱ መሳተፍ የኤች አይቪ ህሙማን መሳተፍ ምን ያህል በምግብ እጥረት ይጎዳሉ ለሚለው እና ለምግብ የሚያጋልጡ ጉዳዮች በማወቅ ለችግሩ መፍትሄ ለመስጠት የሚደረገውን እንቅስቃሴ በከፍተኛ ሁኔታ ያግዛል ::

ማካካሻ

በዚህ ጥናት በመሳተፎዎ ምንም አይነት ማካካሻ አይሰጠዎትም :: ነገር ግን በጥናቱ በመሳተፎዎ ምስጋናችን ከፍተኛ ነው ::

ሚስጥር ስለመጠበቅ

ከዚህ ጥናት የሚገኝ መረጃ በሙሉ በሚስጥራዊነት ይጠበቃል :: ለዚህ ጥናት የሚሰበሰበው እርሶዎን የሚመለከት መረጃ በማህደር የሚቀመጥ ሲሆን ማህደሮዎ በስሙዎ ሳይሆን በተለየ ኮድ ሲቀመጥ ኮዱ ከዋናው ተመራማሪ ውጭ ለማንም አይገለጽም ::

በጥናቱ ያለመሳተፍ ወይም እራስን የማግለል መብት

በጥናቱ ላለመሳተፍ ከፈለጉ በዚህ ጥናት ያለመሳተፍ ወይም ካንድ በላይ ወይም ሁሉንም ጥያቄዎች አለመመለስ ይችላሉ ። በዚህ ጥናት ባለመሳተፎዎ ወይም በከፊል ሆነ በሙሉ ጥያቄዎችን ባለመመለሰዎ ሚያጡት ህክምና ወይም የጤና አገልግሎት አይኖርም ።

ለበለጠ መረጃ

ይህ ጥናት በጎንደር ዩኒቨርሲቲ የጥናትና ምርምር ኮሚቴ ተመርምሮ ይፀድቃል። ስለዚህ በጥናቱ ዙሪያ ማንኛውም ጥያቄ ካሎት ከሚከተሉት ማንኛዉንም ሰው በሚፈልጉት ጊዜ ማነጋገር ወይንም በማንኛውም ጊዜና ሁኔታ ማቅረብ ይችላሉ።

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ስምምነቱ ፡-

ይህ ጥናት ከኤች አይ ቪ ኤድስ ጋር በሚኖሩ ሰዎች ላይ የምግብ እጥረት መጠንና ተያያዥ መከንያቶችን ለማጥናት እንደሆነና የጥናቱ ውጤትም ከኤች አይቪ አድስ ጋር ለሚኖሩ ሰዎች እንክብካቤ ወደፊት እንደሚጠቅም ተገንዝቤ የምሰጠው መረጃ በሚስጥር እንደሚያዝ ተገልጾልኝ ተስማምቻለሁ ።

የተሳታፊ ፊርማ ፡-…….

ቀን……

መረጃ ሰብሳቢ ስምና ፊርማ…….

DECLARATION

The research work in this thesis entitled "Malnutrition among Adult PLWHA receiving ART at Butajira Hospital, Southern Ethiopia" was carried out by me under the supervision of Dr. Baye Gelaw, Mr. Dagnachew Muluye and Mr. Molla Mesele in the College of Medicine and Health Sciences, School of Biomedical and Laboratory Sciences, University of Gondar, for the award of MSc Degree in Infectious and Tropical disease. I declare that this work is original and has not been submitted to any other University or institution.

Name of student: Dereje Gedle (BSc.)

Place of submission: School of Biomedical and Laboratory Sciences, College of Medicine and Health Sciences, University of Gondar

Date of Submission: ----------

This thesis has been submitted for examination with my approval as an advisor.

Name	Signature	Date
1. Dr. Baye Gelaw (MSc,PhD)	_____	_____
2. Mr. Dagnachew Muluye (BSc, MSc)	_____	_____
3. Mr. Molla Mesele (BSc, MSc)	_____	_____

Examiners:

Name	Signature	Date
1. _____	_____	_____
2. _____	_____	_____